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EFFECTS OF ENERGY TAX-PASS-THROUGH AND TRADE MARKUP ON PRICES OF GOODS AND SERVICES

By

Clark W. Bullard
Bruce M. Hannon
Barr Z. Segal

March 1976

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Clark W. Bullard

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Center for Advanced Computation
University of Illinois at Urbana-Champaign
Urbana, Illinois 61801

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ABSTRACT

Prices for goods and services in 1967 are derived for 90 sectors of the economy, using the Energy Input/Output Model maintained at the Center for Advanced Computation. Two economic scenarios -- a tax on energy extraction and an additional markup by the trade sector -- are applied to the Input/Output Model, and resulting effects on sector prices are displayed. Effects of these scenarios on personal consumption expenditures are also given. This is a first-order analysis, in which industrial substitution effects are neglected.

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1. INTRODUCTION

Using the Energy I/O Model [1] developed at the Center for Advanced Computation, it is possible to derive prices of goods and services and to study the effects of various economic schemes on those prices. This report describes how prices were derived at the 90-industry level for 1967 and how they were affected by the following two schemes:

1) Energy Tax Pass Through

   Coal, crude petroleum, and natural gas were taxed $ .50 per million Btu, while electricity was taxed $ .30 per million Btu.* New sector prices were calculated assuming each sector passed the tax straight through to its customers.

2) Trade Markup

   In addition to the energy tax-pass-through a markup (approximately 25%) was added on by the trade sector in order to reflect the fact that percentage markup behavior does not consider where the increasing cost increments are coming from and simply maintains previous pricing policies. This phenomenon may well be a serious cause of inflation. In the long run, competition in the trade sector should erase this effect. (The markup was calculated using the wholesale volume and gross output of the trade sector.)

Due to the absence of any interindustry elasticity equations we have assumed that no substitutions will occur because of the energy tax. This phenomenon is partially true in the short run.

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*The electricity figure results from application of a fuel adjustment factor of .6 to the $.50 tax so that only nuclear and hydro-generated electric power, both of which are primary energy sources, are taxed.

Results are given in tabular form in Section 2, and derivation of formulas for all calculations are shown in Section 3.

In all price calculations, producer prices are generated first and purchaser prices are derived from the former, using margins. Effects of the schemes are shown as percentage changes in resulting purchaser prices over base purchaser prices. In addition, effects of the two schemes on prices for 83 personal consumption expenditure categories are considered. Using the I/O sector ($) components for 83 personal consumption activities and price changes in the I/O sectors, percentage changes in consumption expenditures are computed under each scheme.

2. RESULTS

This section includes the following tables:

Table 1 - Base Sector Prices.

Table 2 - Sector Prices After Energy Tax-Pass-Through.

Table 3 - Percent Price Increases Due To Energy Tax-Pass-Through.

Table 4 - Ranked Percent Price Increases Due To Energy Tax-Pass-Through.

Table 5 - Sector Prices After Energy Tax-Pass-Through With Trade Markup.

Table 6 - Percent Price Increases Due To Energy Tax-Pass-Through With Trade Markup.

Table 7 - Ranked Percent Price Increases Due To Energy Tax-Pass-Through With Trade Markup.

Table 8 - Percent Increases In Personal Consumption Expenditures Due To Energy Tax-Pass-Through.

Table 9 - Ranked Percent Increases In Personal Consumption Expenditures Due To Energy Tax-Pass-Through.

Table 10 - Percent Increases In Personal Consumption Expenditures Due To Energy Tax-Pass-Through With Trade Markup.

Table 11 - Ranked Percent Increases In Personal Consumption Expenditures Due To Energy Tax-Pass-Through With Trade Markup

Percent increases in personal consumption expenditures were computed by (1) normalizing columns of a 90 by 83 bridge table containing I/O components of each PCE activity, (2) computing for each scheme a vector of price increase factors, PIF, as

$$PIF_j = 1 + \frac{PPI_j}{100} \qquad \text{for } j = 1,90$$

where PPI_j is the percent price increase in sector j due to the scheme being considered, and finally, (3) multiplying the normalized bridge table by the PIF vectors and comparing the resulting 83-element vectors to a vector of 1's representing the original normalized based personal consumption expenditures.

In Tables 1, 2 and 5, prices for energy sectors are shown as $/Million Btu while prices for all other sectors are shown in dollars. (All price figures are shown in scientific notation.)

SECTOR NO.	NAME	PRODUCER'S PRICE	PURCHASER'S PRICE	
1	COAL MINING	0.180915E-06	0.416729E-06	
2	CRUDE PETRO. GAS	0.356091E-06	0.356091E-06	*
3	PETRO REFIN PROD	0.940559E-06	0.201661E-05	
4	ELECTRIC UTIL	0.532674E-05	0.532674E-05	
5	GAS UTILITIES	0.747354E-06	0.747354E-06	
6	LIVESTOCK	0.100313E 01	0.139392E 01	
7	MISC AG PRODUCTS	0.989864E 00	0.197492E 01	
8	FOREST FISH PROD	0.100420E 01	0.231013E 01	
9	AG.FOR.FISH SER	0.986256E 00	0.986256E 00	
10	IRON ORE MINING	0.103570E 01	0.103570E 01	*
11	NONFERR MINING	0.104870E 01	0.104870E 01	*
12	STONE CLAY MIN	0.100204E 01	0.127407E 01	
13	CHEM MINERAL MIN	0.109795E 01	0.131630E 01	
14	NEW CONSTRUCTION	0.100625E 01	0.100625E 01	*
15	MAINT.REP CONST	0.100685E 01	0.100685E 01	*
16	ORDNANCE	0.101264E 01	0.166968E 01	
17	FOOD	0.996510E 00	0.156815E 01	
18	TOBACCO	0.100049E 01	0.169405E 01	
19	FABRIC & MILLS	0.103129E 01	0.231656E 01	
20	TEXTILE GOODS	0.100091E 01	0.186714E 01	
21	APPAREL	0.101076E 01	0.171710E 01	
22	FAB TEXTILE PROD	0.101409E 01	0.203662E 01	
23	WOOD PRODUCTS	0.100716E 01	0.159779E 01	
24	WOOD CONTAINERS	0.100541E 01	0.100541E 01	*
25	H'HOLD FURNITURE	0.100329E 01	0.180318E 01	
26	FURN. FIXTURES	0.100466E 01	0.206859E 01	
27	PAPER PRODUCTS	0.103262E 01	0.179035E 01	
28	PAPERBOARD CONT	0.102435E 01	0.181259E 01	
29	PRINTING. PUBL	0.100964E 01	0.153117E 01	
30	CHEM PRODUCTS	0.102087E 01	0.158546E 01	
31	PLASTICS	0.104102E 01	0.171661E 01	
32	DRUGS,TOIL PREP	0.100385E 01	0.172807E 01	
33	PAINTS	0.987925E 00	0.216865E 01	
34	PAVING	0.116751E 01	0.116751E 01	*
35	ASPHALT	0.118687E 01	0.118687E 01	*
36	RUBBER PROD	0.100348E 01	0.183281E 01	
37	LEATHER PRODUCTS	0.699807E 00	0.699807E 00	*
38	FOOTWEAR	0.944728E 00	0.168797E 01	
39	GLASS PRODUCTS	0.103455E 01	0.202385E 01	
40	STONE CLAY PROD	0.103683E 01	0.227765E 01	
41	PRIM IR.STL MANF	0.102024E 01	0.182386E 01	
42	PRIM NONFER MET	0.102038E 01	0.166788E 01	
43	METAL CONTAINERS	0.102433E 01	0.102433E 01	*
44	HEATING,PLUMBING	0.101200E 01	0.182502E 01	
45	SCREW MACH PROD	0.102865E 01	0.192095E 01	
46	FAB METAL PROD	0.101105E 01	0.181371E 01	
47	ENGINES,TURBINES	0.100807E 01	0.151245E 01	
48	FARM MACHINERY	0.100686E 01	0.136840E 01	
49	CONST.MINING EQ	0.101141E 01	0.101141E 01	*
50	MAT HANDLING EQ	0.100728E 01	0.100728E 01	*
51	METALWORKING EQ	0.100209E 01	0.173578E 01	
52	SPEC IND MACH	0.999307E 00	0.181887E 01	
53	GEN IND MACH	0.100946E 01	0.100946E 01	*
54	MACH SHOP PROD	0.996680E 00	0.166765E 01	
55	OFC. COMPUT MACH	0.100476E 01	0.206588E 01	
56	SERVICE IND MACH	0.100989E 01	0.157915E 01	
57	ELEC IND APPARAT	0.100648E 01	0.175033E 01	
58	H'HOLD APPLIANCE	0.101179E 01	0.152481E 01	
59	ELEC LIGHT EQ	0.101051E 01	0.187871E 01	
60	R-TV COMMUN EQ	0.100565E 01	0.164149E 01	
61	ELECTRONIC COMP	0.100469E 01	0.168092E 01	

Table 1. Base Sector Prices

* Sector has no direct allocations to personal consumption expenditures category of final demand.

62	ELECTRICAL EQUIP	0.101623E 01	0.167192E 01	
63	MOTOR VEH & EQ	0.100576E 01	0.121001E 01	
64	AIRCRAFT & PARTS	0.100378E 01	0.106048E 01	
65	TRANSPORT EQUIP	0.101009E 01	0.151240E 01	
66	PROF SCIENT SUPP	0.100528E 01	0.207905E 01	
67	OPTICAL SUPPLIES	0.100775E 01	0.218853E 01	
68	MISC MANUFACT	0.964280E 00	0.192999E 01	
69	RAILROAD	0.101129E 01	0.101129E 01	
70	LOCAL TRANSPORT	0.100695E 01	0.100695E 01	
71	MOTOR FGT TRANSP	0.976928E 00	0.976928E 00	
72	WATER TRANSPORT	0.128062E 01	0.128062E 01	
73	AIR TRANSPORT	0.102621E 01	0.102621E 01	
74	PIPE LINE TRANSP	0.980333E 00	0.980333E 00	*
75	TRANSP SERVICES	0.999195E 00	0.999195E 00	
76	COMMUNICATIONS	0.993446E 00	0.993446E 00	
77	R-TV BROADCAST	0.997343E 00	0.997343E 00	*
78	WATER,SANIT SER	0.101095E 01	0.101095E 01	
79	WHOLE,RETAIL TR	0.100646E 01	0.100646E 01	
80	FINANCE INSUR	0.998108E 00	0.998108E 00	
81	REAL ESTATE	0.992831E 00	0.992831E 00	
82	HOTELS,PERS SER	0.100232E 01	0.100232E 01	
83	BUSINESS SERVICE	0.100070E 01	0.100070E 01	
84	AUTO REPAIR	0.100282E 01	0.100282E 01	
85	AMUSEMENTS	0.990308E 00	0.990308E 00	
86	MED, EDUC SER	0.100001E 01	0.100001E 01	
87	FED GOVT ENTERP	0.832607E 00	0.832607E 00	
88	ST,LOC GOVT ENT	0.101364E 01	0.101364E 01	
89	BUSINESS,TRAVEL	0.100840E 01	0.100840E 01	*
90	OFFICE SUPPLIES	0.101065E 01	0.101065E 01	*

Table 1. (continued)

*Sector has no direct allocations to personal consumption expenditures category of final demand.

SECTOR NO.	NAME	PRODUCER'S PRICE	PURCHASER'S PRICE	
1	COAL MINING	0.684309E-06	0.926893E-06	
2	CRUDE PETRO. GAS	0.684100E-06	0.684100E-06	*
3	PETRO REFIN PROD	0.154302E-05	0.264273E-05	
4	ELECTRIC UTIL	0.721383E-05	0.721383E-05	
5	GAS UTILITIES	0.129710E-05	0.129710E-05	
6	LIVESTOCK	0.103384E 01	0.143201E 01	
7	MISC AG PRODUCTS	0.102196E 01	0.202592E 01	
8	FOREST FISH PROD	0.103607E 01	0.236877E 01	
9	AG.FOR.FISH.SER	0.100255E 01	0.100255E 01	
10	IRON ORE MINING	0.109626E 01	0.109626E 01	*
11	NONFERR MINING	0.111155E 01	0.111155E 01	*
12	STONE CLAY MIN	0.105315E 01	0.134281E 01	
13	CHEM.MINERAL MIN	0.119672E 01	0.142264E 01	
14	NEW CONSTRUCTION	0.104307E 01	0.104307E 01	*
15	MAINT.REP CONST	0.103370E 01	0.103370E 01	*
16	ORDNANCE	0.103990E 01	0.170630E 01	
17	FOOD	0.102659E 01	0.160642E 01	
18	TOBACCO	0.101507E 01	0.172060E 01	
19	FABRIC & MILLS	0.107999E 01	0.238739E 01	
20	TEXTILE GOODS	0.104722E 01	0.192869E 01	
21	APPAREL	0.103681E 01	0.175540E 01	
22	FAB TEXTILE PROD	0.104924E 01	0.208876E 01	
23	WOOD PRODUCTS	0.103864E 01	0.164060E 01	
24	WOOD CONTAINERS	0.103041E 01	0.103041E 01	*
25	H'HOLD FURNITURE	0.102870E 01	0.184279E 01	
26	FURN. FIXTURES	0.103457E 01	0.211712E 01	
27	PAPER PRODUCTS	0.110929E 01	0.188080E 01	
28	PAPERBOARD CONT	0.107140E 01	0.187330E 01	
29	PRINTING. PUBL	0.102426E 01	0.156521E 01	
30	CHEM PRODUCTS	0.114906E 01	0.171856E 01	
31	PLASTICS	0.113763E 01	0.162583E 01	
32	DRUGS.TOIL PREP	0.103649E 01	0.177340E 01	
33	PAINTS	0.104433E 01	0.224558E 01	
34	PAVING	0.144743E 01	0.144743E 01	*
35	ASPHALT	0.142491E 01	0.142491E 01	*
36	RUBBER PROD	0.104666E 01	0.185057E 01	
37	LEATHER PRODUCTS	0.726566E 00	0.726566E 00	*
38	FOOTWEAR	0.965538E 00	0.172172E 01	
39	GLASS PRODUCTS	0.109440E 01	0.210124E 01	
40	STONE CLAY PROD	0.111855E 01	0.238149E 01	
41	PRIM IR.STL MANF	0.113075E 01	0.194906E 01	
42	PRIM NONFER MET	0.109195E 01	0.195404E 01	
43	METAL CONTAINERS	0.108251E 01	0.108251E 01	*
44	HEATING.PLUMBING	0.105998E 01	0.188718E 01	
45	SCREW MACH PROD	0.107372E 01	0.198151E 01	
46	FAB METAL PROD	0.105423E 01	0.187081E 01	
47	ENGINES.TURBINES	0.104398E 01	0.155716E 01	
48	FARM MACHINERY	0.104456E 01	0.141269E 01	
49	CONST.MINING EQ	0.104883E 01	0.104883E 01	*
50	MAT HANDLING EQ	0.103866E 01	0.103866E 01	*
51	METALWORKING EQ	0.102875E 01	0.177523E 01	
52	SPEC IND MACH	0.102753E 01	0.186152E 01	
53	GEN IND MACH	0.104216E 01	0.104216E 01	*
54	MACH SHOP PROD	0.102396E 01	0.170642E 01	
55	OFC. COMPUT MACH	0.102285E 01	0.210234E 01	
56	SERVICE IND MACH	0.104233E 01	0.162167E 01	
57	ELEC IND APPARAT	0.103553E 01	0.179215E 01	
58	H'HOLD APPLIANCE	0.104701E 01	0.156952E 01	
59	ELEC LIGHT EQ	0.104152E 01	0.192531E 01	
60	R-TV COMMUN EQ	0.102322E 01	0.167032E 01	
61	ELECTRONIC COMP	0.103034E 01	0.171816E 01	

Table 2. Sector Prices After Energy Tax-Pass-Through

*Sector has no direct allocations to personal consumption expenditures category of final demand.

62	ELECTRICAL EQUIP	0.104856E 01	0.171586E 01	
63	MOTOR VEH & EQ	0.103967E 01	0.124775E 01	
64	AIRCRAFT & PARTS	0.102491E 01	0.100295E 01	
65	TRANSPORT EQUIP	0.104590E 01	0.165883E 01	
66	PROF SCIENT SUPP	0.102859E 01	0.212125E 01	
67	OPTICAL SUPPLIES	0.102988E 01	0.223104E 01	
68	MISC MANUFACT	0.101170E 01	0.197416E 01	
69	RAILROAD	0.105027E 01	0.105027E 01	
70	LOCAL TRANSPORT	0.104025E 01	0.104025E 01	
71	MOTOR FGT TRANSP	0.999745E 00	0.999745E 00	
72	WATER TRANSPORT	0.139298E 01	0.139298E 01	
73	AIR TRANSPORT	0.112161E 01	0.112161E 01	
74	PIPE LINE TRANSP	0.102623E 01	0.102623E 01	*
75	TRANSP SERVICES	0.100249E 01	0.100249E 01	
76	COMMUNICATIONS	0.100190E 01	0.100190E 01	
77	R-TV BROADCAST	0.101105E 01	0.101105E 01	*
78	WATER,SANIT SER	0.106424E 01	0.106424E 01	
79	WHOLE,RETAIL TR	0.102368E 01	0.102368E 01	
80	FINANCE INSUR	0.100926E 01	0.100926E 01	
81	REAL ESTATE	0.100042E 01	0.100042E 01	
82	HOTELS,PERS SER	0.102748E 01	0.102748E 01	
83	BUSINESS SERVICE	0.101544E 01	0.101544E 01	
84	AUTO REPAIR	0.102665E 01	0.102665E 01	
85	AMUSEMENTS	0.100324E 01	0.100324E 01	
86	MED, EDUC SER	0.102137E 01	0.102137E 01	
87	FED GOVT ENTERP	0.850671E 00	0.850671E 00	
88	ST,LOC GOVT ENT	0.106441E 01	0.106441E 01	
89	BUSINESS,TRAVEL	0.105546E 01	0.105546E 01	*
90	OFFICE SUPPLIES	0.104680E 01	0.104680E 01	*

Table 2. (continued)

*Sector has no direct allocations to personal consumption expenditures category of final demand.

SECTOR NO.	NAME	PCT. INCREASE
1	COAL MINING	122.4155
2	CRUDE PETRO. GAS	146.2788
3	PETRO REFIN PROD	30.9178
4	ELECTRIC UTIL	35.4266
5	GAS UTILITIES	73.5595
6	LIVESTOCK	2.7319
7	MISC AG PRODUCTS	2.5822
8	FOREST FISH PROD	2.5382
9	AG FOR.FISH SER	1.6520
10	IRON ORE MINING	6.0406
11	NONFERR MINING	5.9933
12	STONE CLAY MIN	5.3956
13	CHEM MINERAL MIN	8.0940
14	NEW CONSTRUCTION	3.4530
15	MAINT.REP CONST	2.6668
16	ORDNANCE	2.3135
17	FOOD	2.5679
18	TOBACCO	1.5669
19	FABRIC & MILLS	3.0562
20	TEXTILE GOODS	3.2961
21	APPAREL	2.2304
22	FAB TEXTILE PROD	2.5603
23	WOOD PRODUCTS	2.6794
24	WOOD CONTAINERS	2.4657
25	HOUSEH FURNITURE	2.1570
26	FURN. FIXTURES	2.3458
27	PAPER PRODUCTS	5.0518
28	PAPERBOARD CONT	3.3497
29	PRINTING. PUBL	2.2297
30	CHEM PRODUCTS	8.3965
31	PLASTICS	6.3628
32	DRUGS.TOIL PREP	2.6229
33	PAINTS	3.5475
34	PAVING	23.9759
35	ASPHALT	20.0563
36	RUBBER PROD	3.1512
37	LEATHER PRODUCTS	3.6236
38	FOOTWEAR	1.9994
39	GLASS PRODUCTS	3.8235
40	STONE CLAY PROD	4.5591
41	PRIM IR.STL NONF	6.8660
42	PRIM NONFER MET	4.6124
43	METAL CONTAINERS	5.6802
44	HEATING.PLUMBING	3.4060
45	SCREW MACH PROD	3.1524
46	FAB METAL PROD	3.1463
47	ENGINES.TURBINES	2.9581
48	FARM MACHINERY	3.2369
49	CONST.MINING EQ	3.7002
50	MAT HANDLING EQ	3.1088
51	METALWORKING EQ	2.2726
52	SPEC IND MACH	2.3449
53	GEN IND MACH	3.2368
54	MACH SHOP PROD	2.3244
55	OFC. COMPUT MACH	1.7648
56	SERVICE IND MACH	2.6925
57	ELEC IND APPARAT	2.3690
58	HOUSEH APPLIANCE	2.9319
59	ELEC LIGHT EQ	2.4805
60	R-TV COMMUN EQ	1.7568
61	ELECTRONIC COMP	2.2156

Table 3. Percent Price Increases Due To Energy Tax-Pass-Through

62	ELECTRICAL EQUIP	2.6248
63	MOTOR VEH & EQ	3.1193
64	AIRCRAFT & PARTS	2.0835
65	TRANSPORT EQUIP	2.8797
66	PROF SCIENT SUPP	2.0301
67	OPTICAL SUPPLIES	1.9420
68	MISC MANUFACT	2.2886
69	RAILROAD	3.6544
70	LOCAL TRANSPORT	3.3075
71	MOTOR FGT TRANSP	2.3356
72	WATER TRANSPORT	8.7740
73	AIR TRANSPORT	9.2965
74	PIPE LINE TRANSP	4.6821
75	TRANSP SERVICES	0.3302
76	COMMUNICATIONS	0.8508
77	R-TV BROADCAST	1.3744
78	WATER,SANIT SER	5.2713
79	WHOLE,RETAIL TR	1.7112
80	FINANCE INSUR	1.1177
81	REAL ESTATE	0.7640
82	HOTELS,PERS SER	2.5099
83	BUSINESS SERVICE	1.4726
84	AUTO REPAIR	2.3768
85	AMUSEMENTS	1.3063
86	MED, EDUC SER	2.1361
87	FED GOVT ENTERP	2.1696
88	ST,LOC GOVT ENT	5.0085
89	BUSINESS,TRAVEL	4.6678
90	OFFICE SUPPLIES	3.5775

Table 3. (continued)

RANKED PCT. INCREASES DUE TO ENERGY TAX

SECTOR NO.	NAME	PCT. INCREASE
2	CRUDE PETRO. GAS	148.2788
1	COAL MINING	122.4155
5	GAS UTILITIES	73.5595
4	ELECTRIC UTIL	35.4206
3	PETRO REFIN PROD	30.9178
34	PAVING	23.9759
35	ASPHALT	20.0563
73	AIR TRANSPORT	9.2965
72	WATER TRANSPORT	8.7740
30	CHEM PRODUCTS	8.3965
13	CHEM MINERAL MIN	8.0940
41	PRIM IR.STL MANU	6.8660
31	PLASTICS	6.3628
10	IRON ORE MINING	6.0406
11	NONFER MINING	5.9933
43	METAL CONTAINERS	5.6602
12	STONE CLAY MIN	5.3956
78	WATER.SANIT SER	5.2713
27	PAPER PRODUCTS	5.0518
88	ST.LOC GOVT ENT	5.0065
74	PIPE LINE TRANSP	4.6821
89	BUSINESS.TRAVEL	4.6678
42	PRIM NONFER MET	4.6124
40	STONE CLAY PROD	4.5591
69	RAILROAD	3.8544
37	LEATHER PRODUCTS	3.8238
39	GLASS PRODUCTS	3.8235
49	CONST.MINING EQ	3.7002
90	OFFICE SUPPLIES	3.5775
33	PAINTS	3.5475
14	NEW CONSTRUCTION	3.4530
44	HEATING.PLUMBING	3.4060
28	PAPERBOARD CONT	3.3497
70	LOCAL TRANSPORT	3.3075
20	TEXTILE GOODS	3.2961
53	GEN IND MACH	3.2388
48	FARM MACHINERY	3.2369
45	SCREW MACH PROD	3.1524
36	RUBBER PROD	3.1512
46	FAB METAL PROD	3.1483
63	MOTOR VEH.& EQ	3.1193
50	MAT HANDLING EQ	3.1088
19	FABRIC & MILLS	3.0562
47	ENGINES.TURBINES	2.9561
58	HOUSEHOLD APPLIANCE	2.9319
65	TRANSPORT EQUIP	2.8797
6	LIVESTOCK	2.7319
56	SERVICE IND MACH	2.6925
23	WOOD PRODUCTS	2.6794
15	MAINT.REP CONST	2.6666
62	ELECTRICAL EQUIP	2.6246
32	DRUGS.TOIL PREP	2.6229
7	MISC AG PRODUCTS	2.5622
17	FOOD	2.5679
22	FAB TEXTILE PROD	2.5603
8	FOREST FISH PROD	2.5382
82	HOTELS.PERS SER	2.5099
24	WOOD CONTAINERS	2.4857
59	ELEC LIGHT EQ	2.4805
57	ELEC IND APPARAT	2.3890
84	AUTO REPAIR	2.3768

Table 4. Ranked Percent Price Increases Due To Energy Tax-Pass-Through.

26	FURN. FIXTURES	2.3458
52	SPEC IND MACH	2.3449
71	MOTOR FGT TRANSP	2.3356
54	MACH SHOP PROD	2.3244
16	ORDNANCE	2.3135
68	MISC MANUFACT	2.2886
51	METALWORKING EQ	2.2726
21	APPAREL	2.2304
29	PRINTING, PUBL	2.2297
61	ELECTRONIC COMP	2.2156
25	HOUSEHOLD FURNITURE	2.1970
87	FED GOVT ENTERP	2.1696
86	MED. EDUC SER	2.1361
64	AIRCRAFT & PARTS	2.0835
66	PROF SCIENT SUPP	2.0301
38	FOOTWEAR	1.9994
67	OPTICAL SUPPLIES	1.9420
55	OFC. COMPUT MACH	1.7648
60	R-TV COMMUN EQ	1.7566
79	WHOLE.RETAIL TR	1.7112
9	AG PCR.FISH SER	1.6520
18	TOBACCO	1.5669
83	BUSINESS SERVICE	1.4726
77	R-TV BROADCAST	1.3744
85	AMUSEMENTS	1.3063
80	FINANCE INSUR	1.1177
76	COMMUNICATIONS	0.8508
81	REAL ESTATE	0.7640
75	TRANSP SERVICES	0.3302

Table 4. (continued)

SECTOR NO.	NAME	PRODUCERS	PURCHASERS	
1	COAL MINING	0.684922E-06	0.938402E-06	
2	CRUDE PETRO, GAS	0.384662E-06	0.884662E-06	*
3	PETRO REFIN PROD	0.154553E-05	0.273065E-05	
4	ELECTRIC UTIL	0.722451E-05	0.722451E-05	
5	GAS UTILITIES	0.129835E-05	0.129835E-05	
6	LIVESTOCK	0.104231E 01	0.146657E 01	
7	MISC AG PRODUCTS	0.102850E 01	0.210417E 01	
8	FOREST FISH PROD	0.104090E 01	0.246950E 01	
9	AG FOR,FISH SER	0.100601E 01	0.100601E 01	
10	IRON ORE MINING	0.110162E 01	0.110162E 01	*
11	NONFERR MINING	0.111485E 01	0.111485E 01	*
12	STONE CLAY MIN	0.105565E 01	0.134722E 01	
13	CHEM MINERAL MIN	0.119915E 01	0.142600E 01	
14	NEW CONSTRUCTION	0.105271E 01	0.105271E 01	*
15	MAINT,REP CONST	0.104186E 01	0.104186E 01	*
16	ORDNANCE	0.104444E 01	0.176616E 01	
17	FOOD	0.103443E 01	0.166305E 01	
18	TOBACCO	0.101793E 01	0.176206E 01	
19	FABRIC & MILLS	0.103591E 01	0.250193E 01	
20	TEXTILE GOODS	0.105351E 01	0.200611E 01	
21	APPAREL	0.104269E 01	0.182087E 01	
22	FAB TEXTILE PROD	0.105549E 01	0.218132E 01	
23	WOOD PRODUCTS	0.104462E 01	0.169228E 01	
24	WOOD CONTAINERS	0.103719E 01	0.103719E 01	*
25	H'HOLD FURNITURE	0.103512E 01	0.191446E 01	
26	FURN, FIXTURES	0.103985E 01	0.221135E 01	
27	PAPER PRODUCTS	0.111508E 01	0.194775E 01	
28	PAPERBOARD CONT	0.107678E 01	0.194446E 01	
29	PRINTING, PUBL	0.103863E 01	0.161172E 01	
30	CHEM PRODUCTS	0.115328E 01	0.176485E 01	
31	PLASTICS	0.114291E 01	0.168448E 01	
32	DRUGS,TOIL PREP	0.104156E 01	0.163842E 01	
33	PAINTS	0.105022E 01	0.234908E 01	
34	PAVING	0.145524E 01	0.145524E 01	*
35	ASPHALT	0.143459E 01	0.143459E 01	*
36	RUBBER PROD	0.105182E 01	0.196411E 01	
37	LEATHER PRODUCTS	0.735602E 00	0.735602E 00	*
38	FOOTWEAR	0.971869E 00	0.179060E 01	
39	GLASS PRODUCTS	0.109855E 01	0.218693E 01	
40	STONE CLAY PROD	0.112338E 01	0.248826E 01	
41	PRIM IR,STL MANU	0.113560E 01	0.201564E 01	
42	PRIM NONFER MET	0.109875E 01	0.203201E 01	
43	METAL CONTAINERS	0.108662E 01	0.108662E 01	*
44	HEATING,PLUMBING	0.106582E 01	0.196049E 01	
45	SCREW MACH PROD	0.107792E 01	0.206026E 01	
46	FAB METAL PROD	0.105872E 01	0.194240E 01	
47	ENGINES,TURBINES	0.104997E 01	0.160515E 01	
48	FARM MACHINERY	0.105086E 01	0.144787E 01	
49	CONST,MINING EQ	0.105434E 01	0.105434E 01	*
50	MAT HANDLING EQ	0.104410E 01	0.104410E 01	*
51	METALWORKING EQ	0.103325E 01	0.184124E 01	
52	SPEC IND MACH	0.103296E 01	0.193572E 01	
53	GEN IND MACH	0.104742E 01	0.104742E 01	*
54	MACH SHOP PROD	0.102805E 01	0.176768E 01	
55	OFC, COMPUT MACH	0.102871E 01	0.219771E 01	
56	SERVICE IND MACH	0.104917E 01	0.167528E 01	
57	ELEC IND APPARAT	0.104078E 01	0.188024E 01	
58	H'HOLD APPLIANCE	0.105292E 01	0.161630E 01	
59	ELEC LIGHT EQ	0.104678E 01	0.200236E 01	
60	R-TV COMMUN EQ	0.102786E 01	0.172777E 01	
61	ELECTRONIC COMP	0.103548E 01	0.178074E 01	

Table 5. Sector Prices After Energy Tax-Pass-Through With Trade Markup

*Sector has no direct allocations to personal consumption expenditures category of final demand.

62	ELECTRICAL EQUIP	0.105399E 01	0.177528E 01	
63	MOTOR VEH & EQ	0.104490E 01	0.126634E 01	
64	AIRCRAFT & PARTS	0.102913E 01	0.109163E 01	
65	TRANSPORT EQUIP	0.105233E 01	0.171540E 01	
66	PROF SCIENT SUPP	0.103438E 01	0.221766E 01	
67	OPTICAL SUPPLIES	0.103382E 01	0.233518E 01	
68	MISC MANUFACT	0.101766E 01	0.265904E 01	
69	RAILROAD	0.105287E 01	0.105287E 01	
70	LOCAL TRANSPORT	0.104427E 01	0.104427E 01	
71	MOTOR FGT TRANSP	0.100608E 01	0.100608E 01	
72	WATER TRANSPORT	0.139723E 01	0.139723E 01	
73	AIR TRANSPORT	0.112573E 01	0.112573E 01	
74	PIPE LINE TRANSP	0.102649E 01	0.102649E 01	*
75	TRANSP SERVICES	0.100341E 01	0.100341E 01	
76	COMMUNICATIONS	0.100329E 01	0.100329E 01	
77	R-TV BROADCAST	0.101434E 01	0.101434E 01	*
78	WATER,SANIT SER	0.106748E 01	0.106748E 01	
79	WHOLE,RETAIL TR	0.110945E 01	0.110945E 01	
80	FINANCE INSUR	0.101169E 01	0.101169E 01	
81	REAL ESTATE	0.100282E 01	0.100282E 01	
82	HOTELS,PERS SER	0.103190E 01	0.103190E 01	
83	BUSINESS SERVICE	0.101909E 01	0.101909E 01	
84	AUTO REPAIR	0.103672E 01	0.103672E 01	
85	AMUSEMENTS	0.100688E 01	0.100688E 01	
86	MED, EDUC SER	0.102427E 01	0.102427E 01	
87	FED GOVT ENTERP	0.852034E 00	0.852034E 00	
88	ST,LOC GOVT ENT	0.106794E 01	0.106794E 01	
89	BUSINESS,TRAVEL	0.106633E 01	0.106633E 01	*
90	OFFICE SUPPLIES	0.105166E 01	0.105166E 01	*

Table 5. (continued)

*Sector has no direct allocations to personal consumption expenditures category of final demand.

SECTOR NO.	NAME	PCT. INCREASE
1	COAL MINING	125.177
2	CRUDE PETRO, GAS	148.493
3	PETRO REFIN PROD	35.274
4	ELECTRIC UTIL	35.627
5	GAS UTILITIES	73.727
6	LIVESTOCK	5.355
7	MISC AG PRODUCTS	6.545
8	FOREST FISH PROD	6.899
9	AG FOR,FISH SER	2.003
10	IRON ORE MINING	6.365
11	NONFERR MINING	6.307
12	STONE CLAY MIN	5.741
13	CHEM MINERAL MIN	8.334
14	NEW CONSTRUCTION	4.410
15	MAINT,REP CONST	3.477
16	ORDNANCE	5.898
17	FOOD	6.052
18	TOBACCO	5.195
19	FABRIC & MILLS	8.002
20	TEXTILE GOODS	7.443
21	APPAREL	6.043
22	FAB TEXTILE PROD	7.105
23	WOOD PRODUCTS	5.914
24	WOOD CONTAINERS	3.160
25	H'HOLD FURNITURE	6.172
26	FURN, FIXTURES	6.901
27	PAPER PRODUCTS	8.791
28	PAPERBOARD CONT	7.275
29	PRINTING, PUBL	5.260
30	CHEM PRODUCTS	11.315
31	PLASTICS	9.779
32	DRUGS,TOIL PREP	6.386
33	PAINTS	8.320
34	PAVING	24.645
35	ASPHALT	20.872
36	RUBBER PROD	7.164
37	LEATHER PRODUCTS	5.115
38	FOOTWEAR	6.080
39	GLASS PRODUCTS	8.058
40	STONE CLAY PROD	9.247
41	PRIM IR,STL MANU	10.515
42	PRIM NONFER MET	8.787
43	METAL CONTAINERS	6.081
44	HEATING,PLUMBING	7.423
45	SCREW MACH PROD	7.252
46	FAB METAL PROD	7.095
47	ENGINES,TURBINES	6.129
48	FARM MACHINERY	5.808
49	CONST,MINING EQ	4.245
50	MAT HANDLING EQ	3.656
51	METALWORKING EQ	6.075
52	SPEC IND MACH	6.424
53	GEN IND MACH	3.760
54	MACH SHOP PROD	5.998
55	OFC, COMPUT MACH	6.381
56	SERVICE IND MACH	6.087
57	ELEC IND APPARAT	6.279
58	H'HOLD APPLIANCE	6.000
59	ELEC LIGHT EQ	6.582
60	R-TV COMMUN EQ	5.257
61	ELECTRONIC COMP	5.939

Table 6. Percent Price Increases Due to Energy Tax Pass-Through With Trade Markup.

62	ELECTRICAL EQUIP	6.183
63	MOTOR VEH & EQ	4.821
64	AIRCRAFT & PARTS	2.937
65	TRANSPORT EQUIP	6.388
66	PROF SCIENT SUPP	6.668
67	OPTICAL SUPPLIES	6.701
68	MISC MANUFACT	6.686
69	RAILROAD	4.111
70	LOCAL TRANSPORT	3.706
71	MOTOR FGT TRANSP	2.984
72	WATER TRANSPORT	9.105
73	AIR TRANSPORT	5.698
74	PIPE LINE TRANSP	4.912
75	TRANSP SERVICES	0.422
76	COMMUNICATIONS	0.991
77	R-TV BROADCAST	1.704
78	WATER,SANIT SER	5.593
79	WHOLE,RETAIL TR	10.233
80	FINANCE INSUR	1.361
81	REAL ESTATE	1.006
82	HOTELS,PERS SER	2.951
83	BUSINESS SERVICE	1.837
84	AUTO REPAIR	3.360
85	AMUSEMENTS	1.673
86	MED, EDUC SER	2.426
87	FED GOVT ENTERP	2.333
88	ST,LOC GOVT ENT	5.357
89	BUSINESS,TRAVEL	5.745
90	OFFICE SUPPLIES	4.058

Table 6. (continued)

SECTOR NO.	NAME	PCT. INCREASE
2	CRUDE PETRO.-GAS	148.493
1	COAL MINING	125.177
5	GAS UTILITIES	73.727
4	ELECTRIC UTIL	35.627
3	PETRO REFIN PROD	35.274
34	PAVING	24.645
35	ASPHALT	20.872
30	CHEM PRODUCTS	11.315
41	PRIM IR.STL MANU	10.515
79	WHOLE.RETAIL TR	10.233
31	PLASTICS	9.779
73	AIR TRANSPORT	9.698
40	STONE CLAY PROD	9.247
72	WATER TRANSPORT	9.105
27	PAPER PRODUCTS	8.791
42	PRIM NONFER MET	8.787
13	CHEM MINERAL MIN	8.334
33	PAINTS	8.320
39	GLASS PRODUCTS	8.058
19	FABRIC & MILLS	8.002
20	TEXTILE GOODS	7.443
44	HEATING.PLUMBING	7.423
28	PAPERBOARD CONT	7.275
45	SCREW MACH PROD	7.252
36	RUBBER PROD	7.164
22	FAB TEXTILE PROD	7.105
46	FAB METAL PROD	7.095
26	FURN. FIXTURES	6.901
8	FOREST FISH PROD	6.699
67	OPTICAL SUPPLIES	6.701
68	MISC MANUFACT	6.686
66	PROF SCIENT SUPP	6.658
59	ELEC LIGHT EQ	6.582
7	MISC AG PRODUCTS	6.545
52	SPEC IND MACH	6.424
65	TRANSPORT EQUIP	6.388
32	DRUGS.TOIL PREP	6.386
55	OFC. COMPUT MACH	6.381
10	IRON ORE MINING	6.365
11	NONFERR MINING	6.307
57	ELEC IND APPARAT	6.279
62	ELECTRICAL EQUIP	6.183
25	H'HOLD FURNITURE	6.172
47	ENGINES.TURBINES	6.129
56	SERVICE IND MACH	6.087
43	METAL CONTAINERS	6.081
38	FOOTWEAR	6.080
51	METALWORKING EQ	6.075
17	FOOD	6.052
21	APPAREL	6.043
58	H'HOLD APPLIANCE	6.000
54	MACH SHOP PROD	5.998
61	ELECTRONIC COMP	5.939
23	WOOD PRODUCTS	5.914
16	ORDNANCE	5.898
48	FARM MACHINERY	5.808
89	BUSINESS.TRAVEL	5.745
12	STONE CLAY MIN	5.741
78	WATER.SANIT SER	5.593
88	ST.LOC GOVT ENT	5.357
6	LIVESTOCK	5.355

Table 7. Ranked Percent Price Increases Due To Energy Tax-Pass-Through With Trade Markup

29	PRINTING, PUBL	5.260
60	R-TV COMMUN EQ	5.257
18	TOBACCO	5.195
37	LEATHER PRODUCTS	5.115
74	PIPE LINE TRANSP	4.912
63	MOTOR VEH & EQ	4.821
14	NEW CONSTRUCTION	4.410
49	CONST.MINING EQ	4.245
69	RAILROAD	4.111
90	OFFICE SUPPLIES	4.058
53	GEN IND MACH	3.760
70	LOCAL TRANSPORT	3.706
50	MAT HANDLING EQ	3.656
15	MAINT.REP CONST	3.477
84	AUTO REPAIR	3.380
24	WOOD CONTAINERS	3.160
71	MOTOR FGT TRANSP	2.984
82	HOTELS,PERS SER	2.951
64	AIRCRAFT & PARTS	2.937
86	MED. EDUC SER	2.426
87	FED GOVT ENTERP	2.333
9	AG FOR.FISH SER	2.003
83	BUSINESS SERVICE	1.837
77	R-TV BROADCAST	1.704
85	AMUSEMENTS	1.673
80	FINANCE INSUR	1.361
81	REAL ESTATE	1.006
76	COMMUNICATIONS	0.991
75	TRANSP SERVICES	0.422

Table 7. (continued)

SECTOR NO.	NAME	PCT. INCREASE
1	FOOD PURCH FOR OFF PREM CONSUMP	2.574
2	PURCHASED MEALS AND BEVERAGES	2.554
3	FOOD FURNISHED TO GOVT	2.578
4	FOOD PROD & CONSUMP ON FARM	2.616
5	TOBACCO PRODUCTS	1.567
6	SHOES AND FOOTWEAR	2.153
7	SHOE CLEANING & REPAIR	2.510
8	WOMEN & CHILDRENS CLOTHING	2.246
9	MEN & BOYS CLOTHING	2.223
10	CLOTHING ISSUED TO MILITARY	2.743
11	GARMENT CLEANING, REPAIR	2.510
12	LAUNDERING IN ESTABLISHMENT	2.510
13	JEWELRY & WATCHES	2.232
14	OTHER CLOTHING & ACCESSORIES	2.510
15	TOILET ARTICLES	2.642
16	BARBER, BEAUTY SHOPS	2.510
17	OWNER OCC NONFARM DWELLING	0.764
18	TENANT OCC NONFARM DWELLING	0.779
19	RENTAL VALUE OF FARMHOUSE	0.764
20	OTHER HOUSING	2.510
21	FURNITURE	2.197
22	KITCHEN & HOUSEHOLD APPLIANCES	2.906
23	CHINA, GLASSWARE, TABLEWARE	3.172
24	OTHER DURABLE HOUSE FURNISHINGS	2.904
25	SEMIDURABLE HOUSE FURNISHINGS	2.644
26	CLEANING PREPARATIONS	3.736
27	STATIONERY, WRITING SUPPLIES	3.455
28	ELECTRICITY	35.427
29	GAS	73.559
30	WATER & OTHER SANITARY SERVICES	5.173
31	OTHER FUEL & ICE	35.145
32	TELEPHONE & TELEGRAPH	0.851
33	DOMESTIC SERVICE	0.0
34	OTHER HOUSEHOLD OPERAT EXPEND	2.173
35	DRUG PREP & SUNDRIES	2.744
36	OPHTHALMIC & ORTHOPED PROD	1.962
37	PHYSICIANS	2.136
38	DENTISTS	2.136
39	OTHER PROF MEDICAL SERVICES	2.136
40	PRIVATE HOSPITALS	2.136
41	HEALTH INSURANCE	1.118
42	BROKERAGE CHARGES	1.118
43	BANK SERVICE CHARGES	1.118
44	FINANCIAL INTERMEDIARIES	1.118
45	LIFE INSUR HANDLING EXP	1.118
46	LEGAL SERVICES	1.473
47	FUNERAL & BURIAL EXP	2.385
48	OTHER PERSONAL BUSINESS	1.917
49	NEW & USED CARS	3.114
50	TIRES, TUBES & PARTS	3.233
51	AUTOMOBILE REPAIR & MAINTENANCE	2.377
52	GASOLINE & OIL	30.918
53	BRIDGE & ROAD TOLLS	5.009
54	AUTOMOBILE INSURANCE	1.118
55	STREET & LOCAL BUS TRANSPORT	3.308
56	TAXICAB TRANSPORTATION	3.308
57	RAILWAY (COMMUTER) TRANSPORT	3.854
58	RAILWAY & SLEEPING CAR	3.854

Table 8. Percent Increases In Personal Consumption Expenditures Due To Energy Tax-Pass-Through.

59	INTERCITY BUS TRANSPORTATION	3.308
60	AIRLINE TRANSPORTATION	9.297
61	OTHER INTERCITY TRANSPORTATION	1.910
62	BOOKS AND MAPS	2.230
63	MAGAZINES & NEWSPAPERS	2.230
64	NONDURABLE TOYS & SPORTS EQUIP	2.276
65	DURABLE TOYS & SPORT EQUIPMENT	2.486
66	RADIO & TV RECEIVERS	1.845
67	RADIO & TV REPAIR	2.510
68	FLOWERS, SEEDS, PLANTS	2.516
69	MOTION PICTURE THEATERS	1.306
70	THEATERS AND OPERA	1.306
71	SPECTATOR SPORTS	1.306
72	CLUBS AND FRATERNAL ORGANIZATION	2.136
73	COMMERCIAL AMUSEMENTS	1.779
74	PARIMUTUEL NET RECEIPTS	1.306
75	OTHER RECREATIONAL EXP	1.807
76	PRIVATE HIGHER EDUCATION	2.136
77	PRIVATE ELEM & SECOND SCHOOL	2.136
78	OTHER PRIVATE EDUCATION	2.136
79	RELIG & WELFARE ACTIVITIES	2.136
80	FOREIGN TRAVEL BY US RES	9.252
81	EXPEND ABROAD BY US GOVT	0.0
82	EXPEND IN US BY FOREIGNERS	0.0
83	PERSONAL REMIT TO FOREIGNERS	0.0

Table 8.(continued)

SECTOR NO.	NAME	PCT. INCREASE
29	GAS	73.559
28	ELECTRICITY	35.427
31	OTHER FUEL & ICE	35.145
52	GASOLINE & OIL	30.918
60	AIRLINE TRANSPORTATION	9.297
60	FOREIGN TRAVEL BY US RES	9.252
30	WATER & OTHER SANITARY SERVICES	5.173
53	BRIDGE & ROAD TOLLS	5.009
57	RAILWAY (COMMUTER) TRANSPORT	3.854
58	RAILWAY & SLEEPING CAR	3.854
26	CLEANING PREPARATIONS	3.736
27	STATIONERY, WRITING SUPPLIES	3.455
55	STREET & LOCAL BUS TRANSPORT	3.308
56	TAXICAB TRANSPORTATION	3.308
59	INTERCITY BUS TRANSPORTATION	3.308
50	TIRES, TUBES & PARTS	3.233
23	CHINA, GLASSWARE, TABLEWARE	3.172
49	NEW & USED CARS	3.114
22	KITCHEN & HOUSEHOLD APPLIANCES	2.906
24	OTHER DURABLE HOUSE FURNISHINGS	2.904
35	DRUG PREP & SUNDRIES	2.744
10	CLOTHING ISSUED TO MILITARY	2.743
25	SEMIDURABLE HOUSE FURNISHINGS	2.644
15	TOILET ARTICLES	2.642
4	FOOD PROD & CONSUMP ON FARM	2.616
3	FOOD FURNISHED TO GOVT	2.578
1	FOOD PURCH FOR OFF PREM CONSUMP	2.574
2	PURCHASED MEALS AND BEVERAGES	2.554
68	FLOWERS, SEEDS, PLANTS	2.516
7	SHOE CLEANING & REPAIR	2.510
11	GARMENT CLEANING, REPAIR	2.510
12	LAUNDERING IN ESTABLISHMENT	2.510
14	OTHER CLOTHING & ACCESSORIES	2.510
16	BARBER, BEAUTY SHOPS	2.510
20	OTHER HOUSING	2.510
67	RADIO & TV REPAIR	2.510
65	DURABLE TOYS & SPORT EQUIPMENT	2.486
47	FUNERAL & BURIAL EXP	2.385
51	AUTOMOBILE REPAIR & MAINTENANCE	2.377
64	NONDURABLE TOYS & SPORTS EQUIP	2.276
8	WOMEN & CHILDRENS CLOTHING	2.246
13	JEWELRY & WATCHES	2.232
62	BOOKS AND MAPS	2.230
63	MAGAZINES & NEWSPAPERS	2.230
9	MEN & BOYS CLOTHING	2.223
21	FURNITURE	2.197
34	OTHER HOUSEHOLD OPERAT EXPEND	2.173
6	SHOES AND FOOTWEAR	2.153
37	PHYSICIANS	2.136
38	DENTISTS	2.136
39	OTHER PROF MEDICAL SERVICES	2.136
40	PRIVATE HOSPITALS	2.136
72	CLUBS AND FRATERNAL ORGANIZATION	2.136
76	PRIVATE HIGHER EDUCATION	2.136
77	PRIVATE ELEM & SECOND SCHOOL	2.136
78	OTHER PRIVATE EDUCATION	2.136
79	RELIG & WELFARE ACTIVITIES	2.136
36	OPHTHALMIC & ORTHOPED PROD	1.962

Table 9. Ranked Percent Increases In Personal Consumption Expenditures Due To Energy Tax-Pass-Through.

48	OTHER PERSONAL BUSINESS	1.917
61	OTHER INTERCITY TRANSPORTATION	1.910
66	RADIO & TV RECEIVERS	1.845
75	OTHER RECREATIONAL EXP	1.807
73	COMMERCIAL AMUSEMENTS	1.779
5	TOBACCO PRODUCTS	1.567
46	LEGAL SERVICES	1.473
69	MOTION PICTURE THEATERS	1.306
70	THEATERS AND OPERA	1.306
71	SPECTATOR SPORTS	1.306
74	PARIMUTUEL NET RECEIPTS	1.306
41	HEALTH INSURANCE	1.118
42	BROKERAGE CHARGES	1.118
43	BANK SERVICE CHARGES	1.118
44	FINANCIAL INTERMEDIARIES	1.118
45	LIFE INSUR HANDLING EXP	1.118
54	AUTOMOBILE INSURANCE	1.118
32	TELEPHONE & TELEGRAPH	0.851
18	TENANT OCC NONFARM DWELLING	0.779
17	OWNER OCC NONFARM DWELLING	0.764
19	RENTAL VALUE OF FARMHOUSE	0.764
33	DOMESTIC SERVICE	0.0
81	EXPEND ABROAD BY US GOVT	0.0
82	EXPEND IN US BY FOREIGNERS	0.0
83	PERSONAL REMIT TO FOREIGNERS	0.0

Table 9. (continued)

SECTOR NO.	NAME	PCT. INCREASE
1	FOOD PURCH FOR OFF PREM CONSUMP	6.068
2	PURCHASED MEALS AND BEVERAGES	6.184
3	FOOD FURNISHED TO GOVT	6.067
4	FOOD PROD & CONSUMP ON FARM	6.014
5	TOBACCO PRODUCTS	5.195
6	SHOES AND FOOTWEAR	6.225
7	SHOE CLEANING & REPAIR	2.951
8	WOMEN & CHILDRENS CLOTHING	6.111
9	MEN & BOYS CLOTHING	6.050
10	CLOTHING ISSUED TO MILITARY	7.316
11	GARMENT CLEANING, REPAIR	2.951
12	LAUNDERING IN ESTABLISHMENT	2.951
13	JEWELRY & WATCHES	6.681
14	OTHER CLOTHING & ACCESSORIES	2.951
15	TOILET ARTICLES	6.440
16	BARBER, BEAUTY SHOPS	2.951
17	OWNER OCC NONFARM DWELLING	1.006
18	TENANT OCC NONFARM DWELLING	1.022
19	RENTAL VALUE OF FARMHOUSE	1.006
20	OTHER HOUSING	2.951
21	FURNITURE	6.172
22	KITCHEN & HOUSEHOLD APPLIANCES	6.039
23	CHINA, GLASSWARE, TABLEWARE	7.337
24	OTHER DURABLE HOUSE FURNISHINGS	7.050
25	SEMIDURABLE HOUSE FURNISHINGS	7.190
26	CLEANING PREPARATIONS	7.504
27	STATIONERY, WRITING SUPPLIES	6.339
28	ELECTRICITY	35.627
29	GAS	73.727
30	WATER & OTHER SANITARY SERVICES	5.505
31	OTHER FUEL & ICE	39.347
32	TELEPHONE & TELEGRAPH	0.991
33	DOMESTIC SERVICE	0.0
34	OTHER HOUSEHOLD OPERAT EXPEND	2.533
35	DRUG PREP & SUNDRIES	6.545
36	OPHTHALMIC & ORTHOPED PROD	6.689
37	PHYSICIANS	2.426
38	DENTISTS	2.426
39	OTHER PROF MEDICAL SERVICES	2.426
40	PRIVATE HOSPITALS	2.426
41	HEALTH INSURANCE	1.361
42	BROKERAGE CHARGES	1.361
43	BANK SERVICE CHARGES	1.361
44	FINANCIAL INTERMEDIARIES	1.361
45	LIFE INSUR HANDLING EXP	1.361
46	LEGAL SERVICES	1.837
47	FUNERAL & BURIAL EXP	3.143
48	OTHER PERSONAL BUSINESS	2.222
49	NEW & USED CARS	4.352
50	TIRES, TUBES & PARTS	7.096
51	AUTOMOBILE REPAIR & MAINTENANCE	3.380
52	GASOLINE & OIL	35.274
53	BRIDGE & ROAD TOLLS	5.357
54	AUTOMOBILE INSURANCE	1.361
55	STREET & LOCAL BUS TRANSPORT	3.706
56	TAXICAB TRANSPORTATION	3.706
57	RAILWAY (COMMUTER) TRANSPORT	4.111
58	RAILWAY & SLEEPING CAR	4.111

Table 10. Percent Increases In Personal Consumption Expenditures Due To Energy Tax-Pass-Through With Trade Markup.

59	INTERCITY BUS TRANSPORTATION	3.706
60	AIRLINE TRANSPORTATION	9.698
61	OTHER INTERCITY TRANSPORTATION	2.064
62	BOOKS AND MAPS	5.260
63	MAGAZINES & NEWSPAPERS	5.260
64	NONDURABLE TOYS & SPORTS EQUIP	6.606
65	DURABLE TOYS & SPORT EQUIPMENT	6.251
66	RADIO & TV RECEIVERS	5.420
67	RADIO & TV REPAIR	2.951
68	FLOWERS, SEEDS, PLANTS	6.220
69	MOTION PICTURE THEATERS	1.673
70	THEATERS AND OPERA	1.673
71	SPECTATOR SPORTS	1.673
72	CLUBS AND FRATERNAL ORGANIZATION	2.426
73	COMMERCIAL AMUSEMENTS	2.148
74	PARIMUTUEL NET RECEIPTS	1.673
75	OTHER RECREATIONAL EXP	2.319
76	PRIVATE HIGHER EDUCATION	2.426
77	PRIVATE ELEM & SECOND SCHOOL	2.426
78	OTHER PRIVATE EDUCATION	2.426
79	RELIG & WELFARE ACTIVITIES	2.426
80	FOREIGN TRAVEL BY US RES	9.648
81	EXPEND ABROAD BY US GOVT	0.0
82	EXPEND IN US BY FOREIGNERS	0.0
83	PERSONAL REMIT TO FOREIGNERS	0.0

Table 10. (continued)

SECTOR NO.	NAME	PCT. INCREASE
29	GAS	73.727
31	OTHER FUEL & ICE	39.347
28	ELECTRICITY	35.627
52	GASOLINE & OIL	35.274
60	AIRLINE TRANSPORTATION	9.698
80	FOREIGN TRAVEL BY US RES	9.648
26	CLEANING PREPARATIONS	7.504
23	CHINA, GLASSWARE, TABLEWARE	7.337
10	CLOTHING ISSUED TO MILITARY	7.316
25	SEMIDURABLE HOUSE FURNISHINGS	7.190
50	TIRES, TUBES & PARTS	7.096
24	OTHER DURABLE HOUSE FURNISHINGS	7.050
27	STATIONERY, WRITING SUPPLIES	6.839
36	OPHTHALMIC & ORTHOPED PROD	6.689
13	JEWELRY & WATCHES	6.681
64	NONDURABLE TOYS & SPORTS EQUIP	6.606
35	DRUG PREP & SUNDRIES	6.545
15	TOILET ARTICLES	6.440
65	DURABLE TOYS & SPORT EQUIPMENT	6.251
6	SHOES AND FOOTWEAR	6.225
68	FLOWERS, SEEDS, PLANTS	6.220
2	PURCHASED MEALS AND BEVERAGES	6.184
21	FURNITURE	6.172
8	WOMEN & CHILDRENS CLOTHING	6.111
1	FOOD PURCH FOR OFF PREM CONSUMP	6.068
3	FOOD FURNISHED TO GOVT	6.067
9	MEN & BOYS CLOTHING	6.050
22	KITCHEN & HOUSEHOLD APPLIANCES	6.039
4	FOOD PROD & CONSUMP ON FARM	6.014
30	WATER & OTHER SANITARY SERVICES	5.505
66	RADIO & TV RECEIVERS	5.420
53	BRIDGE & ROAD TOLLS	5.357
62	BOOKS AND MAPS	5.260
63	MAGAZINES & NEWSPAPERS	5.260
5	TOBACCO PRODUCTS	5.195
49	NEW & USED CARS	4.852
57	RAILWAY (COMMUTER) TRANSPORT	4.111
58	RAILWAY & SLEEPING CAR	4.111
55	STREET & LOCAL BUS TRANSPORT	3.706
56	TAXICAB TRANSPORTATION	3.706
59	INTERCITY BUS TRANSPORTATION	3.706
51	AUTOMOBILE REPAIR & MAINTENANCE	3.380
47	FUNERAL & BURIAL EXP	3.143
7	SHOE CLEANING & REPAIR	2.951
11	GARMENT CLEANING, REPAIR	2.951
12	LAUNDERING IN ESTABLISHMENT	2.951
14	OTHER CLOTHING & ACCESSORIES	2.951
16	BARBER, BEAUTY SHOPS	2.951
20	OTHER HOUSING	2.951
67	RADIO & TV REPAIR	2.951
34	OTHER HOUSEHOLD OPERAT EXPEND	2.533
37	PHYSICIANS	2.426
38	DENTISTS	2.426
39	OTHER PROF MEDICAL SERVICES	2.426
40	PRIVATE HOSPITALS	2.426
72	CLUBS AND FRATERNAL ORGANIZATION	2.426
76	PRIVATE HIGHER EDUCATION	2.426
77	PRIVATE ELEM & SECOND SCHOOL	2.426

Table 11. Ranked Percent Increases in Personal Consumption Expenditures Due To Energy Tax-Pass-Through With Trade Markup.

78	OTHER PRIVATE EDUCATION	2.426
79	RELIG & WELFARE ACTIVITIES	2.426
75	OTHER RECREATIONAL EXP	2.319
48	OTHER PERSONAL BUSINESS	2.222
73	COMMERCIAL AMUSEMENTS	2.148
61	OTHER INTERCITY TRANSPORTATION	2.064
46	LEGAL SERVICES	1.837
69	MOTION PICTURE THEATERS	1.673
70	THEATERS AND OPERA	1.673
71	SPECTATOR SPORTS	1.673
74	PARIMUTUEL NET RECEIPTS	1.673
41	HEALTH INSURANCE	1.361
42	BROKERAGE CHARGES	1.361
43	BANK SERVICE CHARGES	1.361
44	FINANCIAL INTERMEDIARIES	1.361
45	LIFE INSUR HANDLING EXP	1.361
54	AUTOMOBILE INSURANCE	1.361
18	TENANT OCC NONFARM DWELLING	1.022
17	OWNER OCC NONFARM DWELLING	1.006
19	RENTAL VALUE OF FARMHOUSE	1.006
32	TELEPHONE & TELEGRAPH	0.991
33	DOMESTIC SERVICE	0.0
81	EXPEND ABROAD BY US GOVT	0.0
82	EXPEND IN US BY FOREIGNERS	0.0
83	PERSONAL REMIT TO FOREIGNERS	0.0

Table 11. (continued)

3. DERIVATION OF FORMULAS

Equations for computing base prices (producer and purchaser), prices after the energy tax pass through, and prices after the additional trade markup are derived below.

3.1 Base Sector Prices

We start with the identity:

$$p_j X_j = \sum_{i=1}^{n} p_i T_{ij} + V_j \tag{3-1}$$

where p_j is the price per unit output of sector j, X_j is gross domestic output for sector j, T_{ij} is the quantity of sector i's goods which sector j buys, V_j is the value added by sector j, and n is the number of sectors in the system. The equation simply says that for a given sector total revenues are equal to total input costs plus value added.

Rewriting equation (3-1) in matrix notation and noting that $T = A\hat{X}$, where $\hat{X}$ is a diagonalized matrix form of X, and A is the direct requirements matrix, we get:

$$p\hat{X} = pA\hat{X} + V \tag{3-2}$$

Here p is the price vector we are seeking and V is the value added vector. Solving for p we get:

$$p(I-A)\hat{X} = V$$

$$p = V\hat{X}^{-1} (I-A)^{-1}$$

Letting $v = V\hat{X}^{-1}$, the value added coefficient vector, we arrive at

$$p = v(I-A)^{-1} \tag{3-3}$$

which is the equation used to compute base sector prices.

The vector p in equation (3-3) consists of producer prices of goods for each sector. The corresponding purchaser price vector, q, is computed as follows:

$$q_j = p_j \left(\frac{\$ \text{ purch}_j}{\$ \text{ prod.}_j} \right)$$

or

$$q_j = p_j \left(\frac{p_j DFD_j + \sum_{i=1}^{8} p_i M_{ij}}{p_j \; DFD_j} \right) \tag{3-4}$$

where DFD_j represents direct allocations of sector j to final demand and M_{ij} is the ith final demand margin for sector j. The 8 margins are Rail Transport, Pipeline Transport, Truck Transport, Water Transport, Air Transport, Insurance, Retail Trade, and Wholesale Trade. Personal consumption was the only final demand category considered here. Simplifying equation (3-4) we get:

$$q_j = p_j + \frac{\sum_{i=1}^{8} p_i M_{ij}}{DFD_j} \tag{3-5}$$

which allows easy computation of purchaser prices. Btu's are used for energy sectors in DFD.

3.2 Prices Altered By Energy Tax Pass Through

The energy tax is reflected in the value added for the sectors to which it is applied. Equation (3-2) becomes

$$p'\hat{X} = p'A\hat{X} + V' \tag{3-6}$$

where p' is the vector of prices after the energy tax pass through and V' is the new value added vector. Solving for p' as in section 3.1 we get

$$p' = v'(I-A)^{-1} \tag{3-7}$$

where $v' = V'\hat{X}^{-1}$ as before.

The tax, in dollars per Btu, is actually applied directly to the value added coefficient vector, v, in the energy extraction sectors:

$$v' = v + \text{tax on energy extraction sectors only.}$$

3.3. Prices Altered By Energy Tax Pass Through With Trade Markup

The trade sector markup is implemented by deriving the change in value added caused by the markup and then substituting this into equation (3-2). Change in value added is derived as follows:

Let S represent the wholesale volume (i.e. the dollar value of all wholesale transactions). Then the markup of the wholesale trade sector is

$$\frac{S + GDO_{wt}}{S} - 1 = \frac{GDO_{wt}}{S}$$

where GDO_{wt} is gross domestic output of the wholesale trade sector.*

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*The markup is 25.14% for the 90-order breakdown, year 1967.

If ΔS is the change in wholesale volume due to marked up prices then

$$\Delta V = \frac{GDO_{wt}}{S} \Delta S \qquad \text{(a scalar)} \qquad (3\text{-}8)$$

Now we convert this to matrix notation and insert it into equation (3-2). Wholesale volume is calculated as

$$S = \sum_{i=1}^{n} \sum_{j=1}^{n+10} DA_{ij} p_i \qquad i,j \text{ such that } \{M_w \neq 0 \text{ or } M_r \neq 0\}$$

Here DA_{ij} is direct allocations from sector i to sector j, while p_i is the producer's price of sector i's goods. The extra 10 elements in the inner sum are direct allocations of sector i to the 10 final demand sectors. Only those elements of DA with a non-zero wholesale (M_w) or retail (M_r) trade margin are summed. The term p_i can be moved outside the inner sum and the latter can be computed as a column vector, D. (D_i would be the total direct allocations from sector i for which there were trade margins.) Now we have, in vector notation,

$$S = pD$$

where p is the row vector of base prices. Likewise,

$$\Delta S = \Delta pD = (p'' - p)D$$

where p'' is the vector of prices resulting from the energy tax pass through with trade markup. Change in value added is then (from equation (3-8))

$$\Delta V = u\hat{X}\,(pD)^{-1}\,(p''D - pD)$$

where $\hat{X}$ is a diagonalized matrix form of the GDO vector, and u is simply

a bit-vector with a 1 in the position corresponding to the trade sector and 0's in all other positions. Now we rewrite equation (3-2) as

$$p''\hat{X} = p''A\hat{X} + V''$$

where V'' is the new value-added vector. Since $V'' = V' + \Delta V$, we can write

$$p''\hat{X} = p''A\hat{X} + V' + u\hat{X}(pD)^{-1}\ (p''D-pD) \qquad (3\text{-}9)$$

Solving equation (3-9) for p'', we first multiply through by $\hat{X}^{-1}$ to get

$$p'' = p''A + V'\hat{X}^{-1} + u(pD)^{-1}\ (p''D-pD)$$

Noting that $V'\hat{X}^{-1} = v$ and expanding the last term we get

$$p'' = p''A + v' + u(pD)^{-1}\ (p''D)-u$$

Rearranging and manipulating a bit, we eventually arrive at

$$p'' = (v'-u)\ (I-A-Du(pD)^{-1})^{-1}. \qquad (3\text{-}10)$$

This is used to solve for p''. (The matrix inversion is avoided, of course, by a simple transformation. Let $R = I-A-Du(pD)^{-1}$. Then equation (3-10) becomes

$$p'' = (v'-u)R^{-1} \quad ,$$

and in turn:

$$p'' = R^{-1^T}\ (v'-u)^T$$

$$p'' = R^{T^{-1}}\ (v'-u)^T$$

$$R^T\ p'' = (v'-u)^T \qquad (3\text{-}11)$$

Equation (3-11) is solved as a system of linear equations with R^T as coefficient matrix and p'' as the unknown vector.)

REFERENCES

1. R. A. Herendeen and C. W. Bullard, "Energy Cost of Goods and Services, 1963 and 1967," Cac Document No. 140, Center for Advanced Computation, University of Illinois at Urbana-Champaign, November, 1974.

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